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Growth of Promising Forest Trees in the Secrest Arboretum

by

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This year marks the 50th anniversary of the founding of the Secrest Arboretum at Ohio's Agricultural Experiment Station. As a sequel to the Station's recently celebrated Diamond Jubilee, it is fitting to note the progress of silvical research in its now well-known Arboretum.

The Experiment Station is to issue soon a special forestry circular listing performance records of the woody plants tried until now at its Secrest Arboretum. It will become a supplementary, companion publication to the helpful finding list and guide.[1/]

Since 1908, the Arboretum plantings increased steadily until in 1922 there existed 165 different kinds of trees, shrubs, and woody ornamentals, some 540 in 1932, over 600 in 1950, and today 691. By 1958 there had been on trial nearly 1,300 species, varieties, hybrids and clones, native to many parts of the North Temperate Zone. All of these have been catalogued in this forthcoming check list, wherein they appear in alphabetical sequence by genera and species. Success or failure of each plant entry, with cause for the latter, is shown there with descriptive symbols. Growth data, where available, represent plot averages, giving mean tree diameters breast-high and total heights on age.

1/ Diller, O. D. and H. R. Muckley, Nov. 1953. Finding List and Guide to the Secrest Arboretum. Special Circular 91, Ohio Agr. Exp-t Sta., Wooster, Ohio.

Those performance records hold much of informative value to people of the Buckeye State. Arboretums serve as proving grounds of woody plants introduced from near and distant lands. It is just as important to determine the species unsuited as those suited for Ohio conditions. Prospective planters wish their species selections to be proven hardy and adapted to local soil types. And planting goals nowadays are almost legion, ranging from wood products, Christmas trees, shade trees or ornamentals, to game food or cover, revegetation of coal-stripped sites, soil conservation, windbreaks, or other objectives.

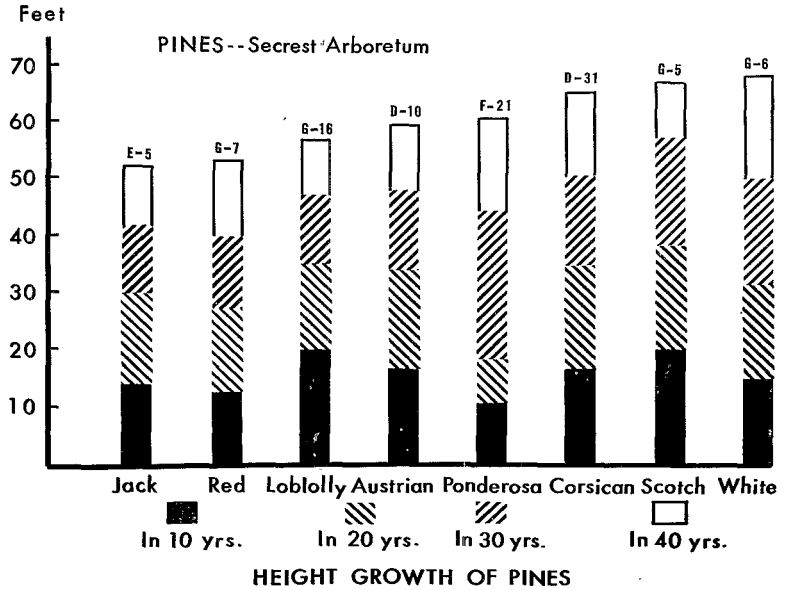
Though a plant's desirability for certain uses is not dependent on its growth rate, for some, like wood production, it bears a vital relationship to the future success of present-day planting ventures. Experienced forest managers will endeavor to grow the most of the best timber within the shortest possible time.

There follow records of Arboretum-grown groups of forest trees of outstanding promise to Ohioans.

The Pines

Pines would probably be voted the most useful of our evergreen trees. They attain to large size, are noted for their rapid wood yield, and rank among the least demanding of the tree genera employed locally for reforestation.

The genus Pinus occurs under a wide variety of soil and climatic conditions, extending from Arctic ice on the north to Central America, the East and West Indies, Canary Islands, Atlas and Himalaya Mountains on the south.



HEIGHT GROWTH OF PINES

Throughout that vast territory, in practically every country, it surpasses all competitors in its current output of commercial wood products.

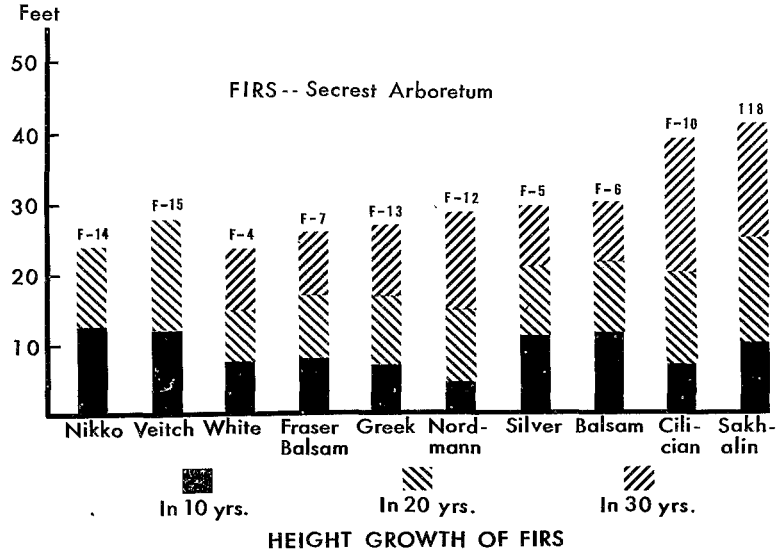
Some 80 to 90 species of pine inhabit the Northern Hemisphere; 12 are native to eastern and southern United States, and about twice as many exist in the West. At least 24 different kinds of pine, plus various varieties, are now represented in the Secrest Arboretum. Chart 1 presents growth comparisons within pure pine plots, from data collected by research foresters for many years.

All of the above pines have grown well in Wooster silt loam. The white, Scotch, and Corsican pines now lead, but loblolly, Austrian, and red pines are close. Ponderosa pine of Rocky Mountain origin appears to thrive in this Wayne County, Ohio climate. Jack or Banks pine, native in the Lake States region and Canada, though making good early progress here, is but a short-lived tree.

The Firs

As specimen conifers about the home, or for formal effects, firs exhibit an unusual appeal. These are the evergreens, par excellence, of beauty. They maintain throughout life their precise pyramidal form.

Many persons consider a fir the ideal Christmas tree. It possesses symmetry, density and attractiveness of foliage. Enterprising growers would do well to try some of the firs shown on Chart 2, particularly the Nikko or the Veitch of Japan, the Nordmann of the Caucasus region, or the Cilician of Asia Minor.



HEIGHT GROWTH OF FIRS

Chart 2

Obviously the firs are rather slow-growing trees. They succeed best in heavy loams, moist but not marshy. White or concolor fir alone withstands a drier habitat.

Balsam fir seldom prospers where humid, hot summers prevail, nor does the Fraser balsam retain here the gracefulness displayed in its southern Appalachian mountain home.

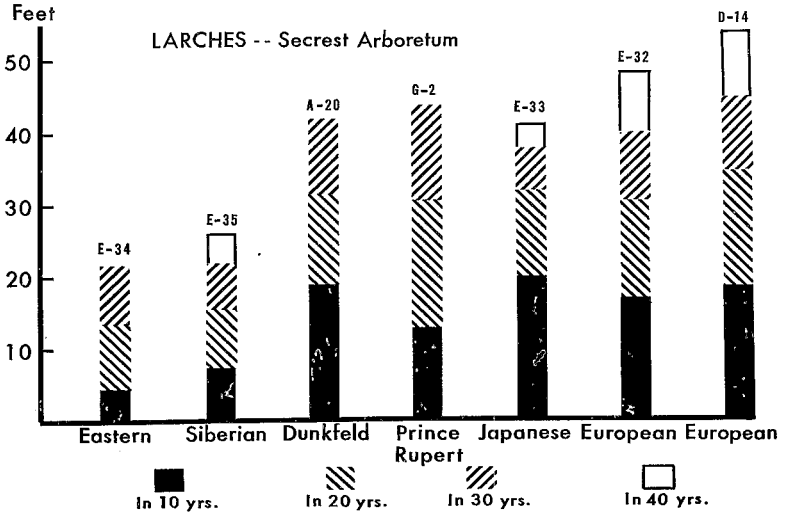
The Larches

Larches stem from ancient origin, for their fossil remains have been found both in Europe and America. They are rugged, straight-boled conifers of rather boreal or alpine range, and invariably are frost-hardy.

Larch seems striking in its every seasonal aspect - the light green of its new foliage in springtime, changing to a blue-green tone at mid-summer, then to a bright golden yellow in autumn. By snowfall, when its deciduous needles have dropped, larch appears lifeless beside its evergreen kin.

All larches require good deep soils, but grow better on well-drained sites than in swamps. Being exceedingly intolerant of shade, they invariably command a position in the forest overstory.

Larch makes more rapid juvenile height growth than probably any other conifer. Trees only 10 years of age often have grown 18 to 20 feet or more in height.



HEIGHT GROWTH OF LARCHES

Chart 3

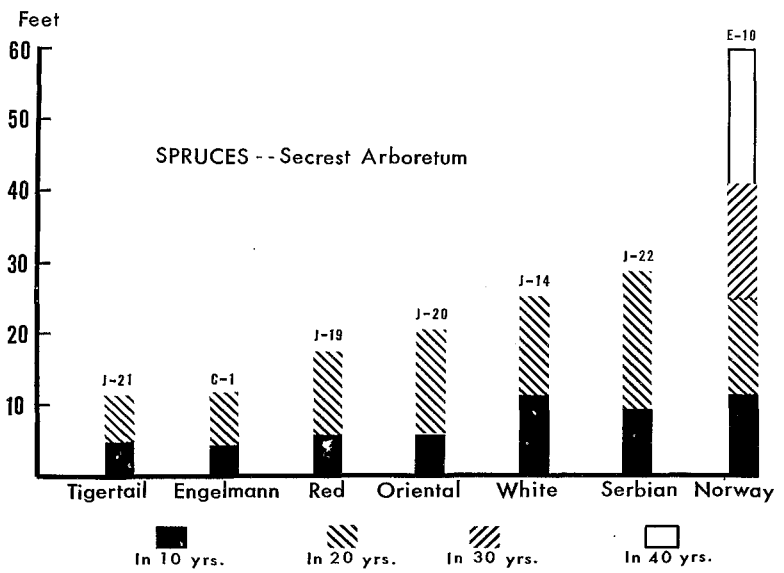
The European and Japanese larches evince superiority for forest planting to our native eastern species. They are thus used to some extent throughout the Central States. Of the two, the European larch, from the mountains of central Europe, gives best results in this locality. A hybrid of those exotics, the Dunkfeld larch, offers perhaps more promise than either of its parents. For some unknown reason, the hardy Siberian larch has done very poorly at Wooster.

The Spruces

Its dark, spire-like spruce crowns lend a year-around dignity to the Secrest Arboretum. Symmetry of form, colorful foliage, and pendulous branches comprise their principal charm. Spruces are valued timbers of commerce, and formerly were America's main source of paper pulp.

Like the larch, spruce requires a good fresh soil, but it need not be deep as its root system is quite superficial. Though tolerant of shade, it seldom thrives beneath the canopy of another tree. Occasionally it shows sensitivity to early or late frost, but generally becomes hardy with increased age.

Growth of both the Norway and the white spruces surpasses that of the others. But for sheer lustrous beauty the Serbian and oriental excel. Neither the red nor the Engelman have prospered here, nor is the spiny-needled tigertail from Japan considered of promise for Ohio.



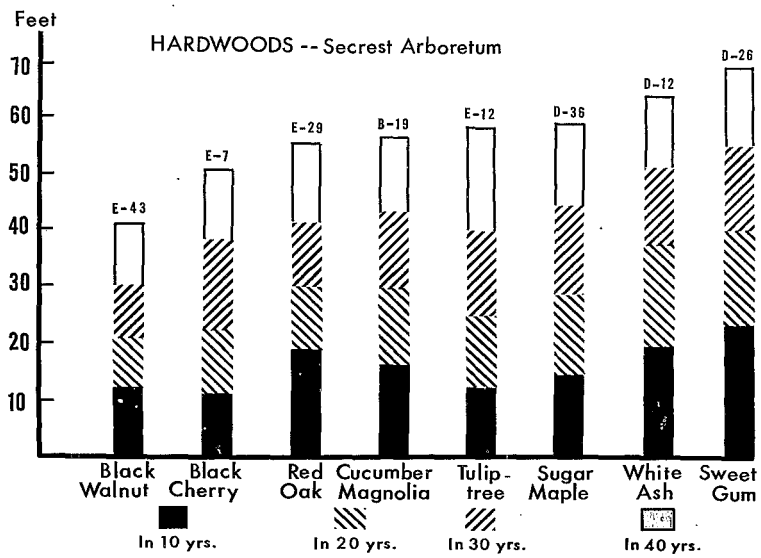
HEIGHT GROWTH OF SPRUCES

Chart 4

Hardwoods

Broadleaved or "summer green" trees are frequently referred to as hardwoods. Most, but not all, of them are deciduous; that is, they shed their foliage annually.

Ohio's original forests held some of the finest mixed hardwood timber in this country. Unfortunately, within her second-growth, abused stands of today high-quality sawtimber rarely exists in quantity. Chart 5 depicts the growth rate of a few of our most valuable deciduous tree species.



HEIGHT GROWTH OF HARDWOODS

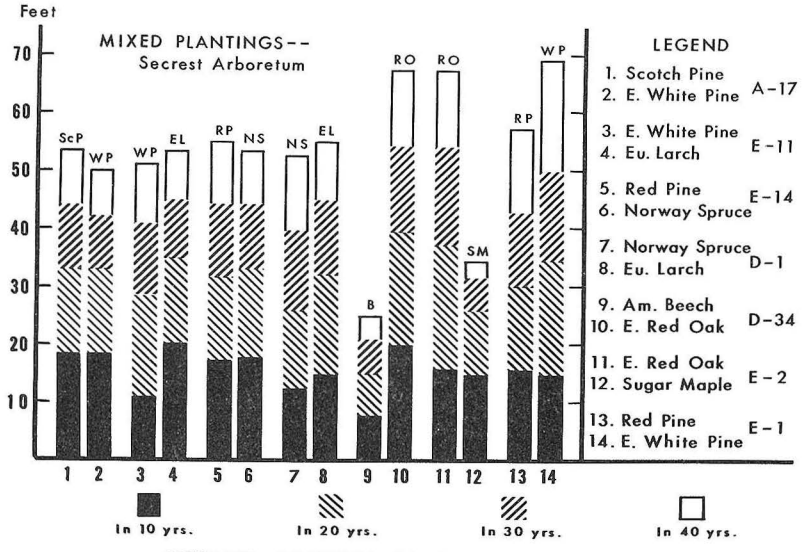
Chart 5

All of these are promising hardwoods to plant in heavy soils of moderate fertility, particularly on lower slopes or bottomlands. But if placed on the impoverished old-field sites of unglaciated Ohio, their progress generally becomes unsatisfactory. Contrary to popular opinion, they need a fairly good habitat for their best development. Rarely do they attain a large size in any but rich, deep, moist loam soils with good drainage.

Mixed Plantings

For artificial afforestation in Ohio, suitable tree mixtures have certain definite advantages. They offer lower risks, insofar as fungal or insect troubles are concerned, for even if one companion species be

wiped out the others may bring a return to their owners. But without due regard for specific site index ratings, too often one plantation component overtops and suppresses its associates. Hence, the alert field forester maintains a lookout for successful mixed plantings. There exist some promising forest tree mixtures in the Secrest Arboretum, such as follow:



HEIGHT GROWTH OF MIXED PLANTINGS

Chart 6

Two of our examples show tolerant (dense-foliaged) sugar maple and beech associated with the less tolerant (thin-foliaged) eastern red oak. Due to the oak's more rapid height growth, two-storied stands develop, wherein beech or maple occupy the understory. Together the site is utilized more fully, so high wood yields may result. Then, too, the presence of beech or maple leaf litter tends to build up site productivity.

Larch grown with white pine, or with Norway spruce, makes a suitable combination. In both cases, these tree associates obtain their requisite amounts of growing-space. Likewise, a white pine-Norway spruce or a white pine-red pine association has proven satisfactory. The two latter species not infrequently occur together in nature where their ranges overlap. Mixtures of tolerant with intolerant trees permit of great variety, provided that compatible companion species are chosen.

Growth rates of Ohio trees depend on inconstant factors, such as soil fertility, moisture and drainage, and adaptability of the species. All trees do best in favorable situations, but often respond differently if found growing together in the same environment.

The growth habits of our tree species are quite important to a silviculturist. Knowledge of them is the basis for success when managing mixed stands of forest trees.

A red oak plot (D-34) underplanted with beech. This photo was taken in May, 1937. For its growth record see bars 9 and 10 of Chart 6 titled, "Height Growth of Mixed Plantings."